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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/589,079 | 08/11/2006 | Gerhard Schiessl | PNL21570 | 5876 |

77407 7590 12/23/2008

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| EXAMINER | |
|---|---|
| VELASQUEZ, VANESSA T | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 1793 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 12/23/2008 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| *Office Action Summary* | **Application No.** 10/589,079 | **Applicant(s)** SCHIESSL, GERHARD |
|---|---|---|
| | **Examiner** Vanessa Velasquez | **Art Unit** 1793 |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --***

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on 25 September 2008.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) 1-25 is/are pending in the application.

4a) Of the above claim(s) 10-13 and 25 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-9 and 14-24 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 11 August 2006 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date Aug. 11, 2006.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Restriction*

Applicant's election with traverse of Group I, claims 1-9 and 14-24, in the reply filed on September 25, 2008 is acknowledged. The traversal is with respect to Groups I and III and is on the grounds that Groups I and III relate to the same inventive concept. This is not found persuasive because the Examiner had previously demonstrated that unity was lacking between both groups.

The requirement is still deemed proper and is therefore made FINAL.

### *Priority*

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy of German Application No. 10 2004 007 071.7 has been received and placed in the file of record.

### *Information Disclosure Statement*

One (1) information disclosure statement (IDS) was received on August 11, 2006. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner. However, references EP 1 380 666 and DE 102 12 400 C1 were not considered because copies of these documents were not provided.

### *Specification*

The disclosure is objected to because it makes reference to an incorrect figure. Page 2 (paragraphs 2 and 4) refer to FIG. 1 as a time-temperature diagram. This is not correct because FIG. 2 and 3 are time-temperature diagrams.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 112, Second Paragraph*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-9 and 14 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, independent claim 1 recites that a component is produced by reshaping a coated plate of quenched and tempered steel "before reshaping in a first process step." It is unclear how the component can be reshaped before it is already reshaped. Furthermore, because the component has already been reshaped, it is unclear the meaning of the "first process step." Applicant is advised to clarify to clarify the claim language. For the purposes of examination, the Examiner will interpret the “reshaping" step to signify that the quenched and tempered steel is reshaped before the first austenitizing step. Claims 2-9 and 14 are likewise rejected for being dependent on rejected base claim 1.

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1, 2, 6, 9, 14, 15, and 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. (US 2004/0009366 A1) in view of Whitfield et al. (US 2,396,730).

Regarding claims 1, 14, and 15, Takagi et al. teach a method of heat treating an aluminum-coated steel body. The method comprises coating a steel sheet, thereby producing a coated steel sheet (para. [0013]); heating the coated sheet to a temperature between 900$^{o}$C and 950$^{o}$C (para. [0026]), which is above or encompasses the upper critical temperature (i.e., the temperature above which steel is transformed into austenite); removing the heated steel from a heated furnace (para. [0027]), thereby

causing the steel to cool at a rate of 5-15$^{o}$C/second; transferring the heated steel to a forming press and stocking (storing) the steel in the press, where cooling continues to occur (para. [0027]); and forming the sheet at an elevated temperature of 700-800$^{o}$C (para. [0028]), which is above or encompasses the upper critical temperature (i.e., temperature above which steel is transformed into austenite). The structure transformation and increase in the thickness of the sheet would be expected to necessarily occur as a result of the heat treatment during the first austenitization.

Still regarding claims 1, 14, and 15, Takagi et al. do not teach shaping the sheet after coating and before first austenitization. However, it would be obvious to one of ordinary skill in the art to conduct a shaping operation, such as bending or cutting, in order to form a precursor component of a desired shape appropriate to the requirements of an application.

Still regarding claims 1 and 14, the resulting component is a shaped member (formed) that has a martensitic structure (hardened) (para. [0027]).

Still regarding claims 1, 14, and 15, Takagi et al. are silent as to the characteristics of the coated steel sheet. Specifically, Takagi et al. do not disclose whether the coated sheet comprises quenched and tempered steel. Whitfield et al., drawn to a method of coating iron-based alloys with aluminum or aluminum alloys, teach a method of coating that involves quenching and tempering the coated steel (page 3, second column, lines 17-20). Steels manufactured by this method possess excellent hardness and sufficient toughness, which are important properties for steels used in the manufacture of aeronautical engines (page 4, first column, lines 1-9).

Therefore, it would have been obvious to one of ordinary skill in the art to use a quenched and tempered aluminum-coated steel, as taught by Whitfield et al., in the process of Takagi et al. because quenched and tempered coated steels have good mechanical properties such as hardness and toughness.

Regarding claims 2 and 18, Takagi et al. teach that during the first austenitization, the steel is held at a holding temperature of 900-950°C for 2-8 minutes (para. [0006]). Takagi et al. also teach that the heating rate to arrive at 900-950°C is 1-10°C/second. Taking the heating rate in consideration and starting heating from a room temperature of 25°C and ending at holding temperature of 950°C, the time elapsed to arrive at the holding temperature could be as long as approximately 15 minutes. (This number was obtained by dividing (950-25°C) by a heating rate of 60°C/minute). Therefore, the total time the steel resides in the furnace could be anywhere from 17 minutes (2 minutes + 15 minutes) to 23 minutes (8 minutes + 15 minutes) for a heating rate of 1°C/second and a holding temperature of 950°C. The range of 17-23 minutes lies within the claimed range. Overlapping ranges between those taught in the prior art and recited in the claims is sufficient to establish a *prima facie* case of obviousness (MPEP § 2144.05, section I).

Regarding claim 6, Takagi et al. in view of Whitfield et al. do not teach a heating method wherein the first heating takes place at a steel or sheet manufacturer while the second heating occurs at a processing company. However, it would be obvious to conduct any portion of the second heat treatment at a processing company where the part may be finally formed and shaped because it would allow for direct manufacture of

the steel precursor while heated or immediately after heating. This saves money because less force is required to form a part while it is heated since it is more easily deformable. This also saves time because there is no wait between heating and forming step.

Regarding claim 9, the sheet has not been formed until processed in the forming press. Therefore, it is a “blank.”

Regarding claim 19, Takagi et al. are silent as to the residence time of the second austenitization. However, it is well held that discovering an optimum value of a result-effective variable involves only routine skill in the art (MPEP § 2144.05, section II). In the instant case, heating time is a result-effective variable because it affects how much the coating of the steel oxidizes (para. [0026], page 3). Therefore, it would have been obvious to one of ordinary skill in the art to have optimized the residence time of the second heat treatment of Takagi et al. in order to manipulate the amount of oxide deemed acceptable to the skilled artisan for a particular application.

Regarding claim 20, Takagi et al. are silent as to whether a change in thickness occurs in the steel sheet during the second austenitization. However, no change in thickness would be inherent to this heating step for an optimized residence time, as discussed in claim 19 above, wherein residence time can be optimized to control the growth of oxide, which would lead to changes in the thickness of the sheet. Furthermore, one of ordinary skill in the art would be motivated to suppress any changes in the thickness of the sheet, as it would be undesirable to produce distorted sheets or sheets of varying thickness in a structural member.

Regarding claim 21, the steel is martensitic after the forming operation (para. [0028], last sentence).

Regarding claim 22, the steel is transferred to a forming press after first austenitization (para. [0027]).

Regarding claim 23, while transferring the steel to the forming press, it begins to cool at a cooling rate of 5-15$^{o}$C/second to arrive at a temperature of 700-800$^{o}$C for the second heat treatment (para. [0027]). Therefore, at least part of the second heat treatment (i.e., the time at which the steel arrives at 700-800$^{o}$C) occurs during the transferring step.

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. (US 2004/0009366 A1) in view of Whitfield et al. (US 2,396,730), as applied to claim 1 above, and further in view of Smith ("Types of Heat-Treating Furnaces," Vol. 4, ASM Handbooks Online) and Hassell et al. (Induction Heat Treating of Steel," Vol. 4, ASM Handbooks Online).

Regarding claim 5, Takagi et al. in view of Whitfield et al. are silent as to the specific types of furnaces in which the heat treatments take place. However, the claimed furnaces are well known in the art. For example, fuel-fired furnaces, where the fuel may be gaseous, are advantageous because it operating costs are relatively low (Smith, "Advantages of Fuel-Fired Furnaces"). Electric furnaces are advantageous because they produce relatively less pollution (Smith, "Advantages of Electrically Heated Furnaces"). Therefore, it would have been obvious to one of ordinary skill in the

art to utilize a gas or electric heating furnace in the process of Takagi et al. in view of Whitfield et al. because of their respective low cost and low environmental impact qualities.

Still regarding claim 5, Takagi et al. in view of Whitfield et al. and Smith do not teach heating by induction. However, induction heat treating is well-known, as evidenced by Hassell et al., where induction heating is used for a number of reasons such as surface and through hardening, tempering and stress relieving, normalizing and annealing, precipitation hardening or aging, and grain refinement ("Induction Heat Treatments" section). Therefore, it would have been obvious to one of ordinary skill in the art to implement induction heating, as disclosed by Hassell et al., to the process of Takagi et al. in view of Whitfield et al. in order to obtain a steel component with at least one of the properties stated above.

5. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. (US 2004/0009366 A1) in view of Whitfield et al. (US 2,396,730), as applied to claim 1 above, and further in view of Callister, Jr. (*Materials Science and Engineering, An Introduction*, Sixth edition).

Regarding claim 3, Takagi et al. in view of Whitfield et al. do not teach repeating an austenitizing heat treatment within the second furnace. Callister, Jr. teaches that normalizing (heating above the austenitic upper critical temperature) refines grains and renders them more uniform (page 360, “Normalizing”). Therefore, it would have been obvious to one of ordinary skill in the art to apply an additional heat treatment inside the

second furnace in order to improve the grain size distribution and decrease the grain size, as taught by Callister, Jr., in the steel alloy of Takagi et al. in view of Whitfield et al. in order to produce a more homogeneous steel.

With regard to the structure transformation, heating above the upper critical temperature induces the formation of austenite.

With regard to not having an increase in thickness during the further heat treatments, Takagi et al. are silent as to whether a change in thickness occurs in the steel sheet during the second austenitization. However, no change in thickness would be inherent to this heating step for an optimized residence time, as discussed in claim 19 above, wherein residence time can be optimized to control the growth of oxide, which would lead to changes in the thickness of the sheet. Furthermore, one of ordinary skill in the art would be motivated to suppress any changes in the thickness of the sheet, as it would be undesirable to produce distorted sheets or sheets of varying thickness in a structural member.

Regarding claim 4, Takagi et al. are silent as to the residence time of the second austenitization. However, it is well held that discovering an optimum value of a result-effective variable involves only routine skill in the art (MPEP § 2144.05, section II). In the instant case, heating time is a result-effective variable because it affects how much the coating of the steel oxidizes (para. [0026], page 3). Therefore, it would have been obvious to one of ordinary skill in the art to have optimized the residence time of the second heat treatment of Takagi et al. in order to manipulate the amount of oxide deemed acceptable to the skilled artisan for a particular application.

6. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. (US 2004/0009366 A1) in view of Whitfield et al. (US 2,396,730), as applied to claim 15 above, and further in view of Smith (“Types of Heat-Treating Furnaces,” Vol. 4, ASM Handbooks Online).

Regarding claim 16, Takagi et al. in view of Whitfield et al. are silent as to the specific types of furnaces in which the heat treatments take place. However, the claimed furnaces are well known in the art. For example, fuel-fired furnaces, where the fuel may be gaseous, are advantageous because it operating costs are relatively low (Smith, "Advantages of Fuel-Fired Furnaces"). Electric furnaces are advantageous because they produce relatively less pollution (Smith, “Advatages of Electrically Heated Furnaces”). Therefore, it would have been obvious to one of ordinary skill in the art to utilize a gas or electric heating furnace in the process of Takagi et al. in view of Whitfield et al. because of their respective low cost and low environmental impact qualities.

7. Claims 8 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. (US 2004/0009366 A1) in view of Whitfield et al. (US 2,396,730), as applied to claim 15 above, and further in view of Brodt et al. (US 2002/0069506).

Regarding claims 8 and 17, Takagi et al. in view of Whitfield et al. do not teach reinforcing the sheet between heat treatment steps. Brodt et al. teach that steel sheets may be reinforced by applying a similar or same steel material onto a base sheet in order to strengthen the base sheet at particular high-pressure points (para. [0050]).

Reinforcements are often more desirable than manufacturing a thicker sheet, as reinforcements allow less material to be used, resulting in a sheet that remains strong but is also lightweight (Brodt et al., para. [0003]). Therefore, it would have been obvious to one of ordinary skill in the art to incorporate the reinforcing step of Brodt et al. into the process of Takagi et al. in view of Whitfield et al. because it decreases manufacturing material costs while providing a steel sheet of sufficient strength.

8. Claims 7 and 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takagi et al. (US 2004/0009366 A1) in view of Whitfield et al. (US 2,396,730), as applied to claim 15 above, and further in view of Hassell et al. (Induction Heat Treating of Steel," Vol. 4, ASM Handbooks Online).

Regarding claims 7 and 24, Takagi et al. in view of Whitfield et al. do not teach heating the sheet to different intensities at different locations during the second heat treatment. Hassell et al. teach that it is common to heat treat at selected locations of the surface of an alloy order to obtain a part that has varying mechanical properties (Hassell, "Selective Hardening"). A surface with different mechanical properties is sometimes required for applications where, for instance, the loading stresses vary or are uneven (Hassell, "Selective Hardening"). Therefore, it would have been obvious to one of ordinary skill in the art to heat the steel of Takagi et al. in view of Whitfield et al. to different intensities at different locations in order to form a part with varying mechanical properties over its surface, as taught by Hassell et al., for a particular application.

## *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vanessa Velasquez whose telephone number is 571-270-3587. The examiner can normally be reached on Monday-Friday 9:00 AM-6:00 PM ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached at 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art Unit 1793

/Vanessa Velasquez/
Examiner, Art Unit 1793